

## **Claims**

What is claimed:

1. A method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit, the method comprising:

once per predetermined interval of time, the transceiver transmitting a signal comprising multiple carriers, a plurality of the carriers comprising training symbols, a plurality of the carriers comprising information symbols;

the subscriber unit generating frequency response estimates at the frequencies of the carriers comprising training symbols each interval of time;

converting the frequency response estimates into a time domain response generating an impulse response once per interval of time;

filtering the impulse responses over a plurality of intervals of time;

determining a channel profile from the filtered impulse responses;

converting the channel profile to the frequency domain generating a channel interpolator; and

generating the characterized frequency response from the channel interpolator and the frequency response estimates.

2. The method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit of claim 1, wherein filtering the impulse responses over a plurality of intervals of time comprises:  
  
    averaging the impulse responses over a plurality of intervals of time.
3. The method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit of claim 1, wherein filtering the impulse responses over a plurality of intervals of time comprises:  
  
    accumulating the impulse responses over a plurality of intervals of time.
4. The method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit of claim 1, wherein filtering the impulse responses over a plurality of intervals of time comprises:  
  
    weighted averaging of the impulse responses over a plurality of intervals of time.
5. The method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit of claim 4, wherein the weighted averaging is dependent upon at least one of a phase error between the impulse responses, and an amplitude error between the impulse responses.

5. The method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit of claim 1, wherein determining a channel profile from the filtered impulse responses comprises peak detecting the filtered impulse responses.
6. The method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit of claim 1, wherein determining a channel profile from the filtered impulse responses comprises detecting elements of the filtered impulse response having amplitudes greater than a predetermined threshold.
7. The method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit of claim 1, wherein generating the characterized frequency response from the channel interpolator and the frequency response estimates comprises convolving the channel interpolator with the frequency response estimates.
8. The method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit of claim 1, wherein the channel interpolator is re-determined after the transmission of a predetermined number of transmitted signals.
9. The method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit of claim 1, wherein the channel interpolator is

determined only a single time and remains fixed during the transmission of many signals.

10. The method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit of claim 1, wherein converting the frequency response estimates into a time domain response generating an impulse response once per interval of time comprises:

generating an impulse response by performing an IFFT on the frequency response estimates once per interval of time.

11. The method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit of claim 1, wherein converting the channel profile to the frequency domain generating a channel interpolator comprises:

performing an FFT on the channel profile generating a channel interpolator.

12. A method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit, the method comprising:

once per predetermined interval of time, the transceiver transmitting a signal comprising multiple carriers, a plurality of the carriers comprising training symbols, a plurality of the carriers comprising information symbols;

the subscriber unit generating frequency response estimates at the frequencies of the carriers comprising training symbols each interval of time;

filtering the frequency response estimates over a plurality of intervals of time;

converting the filtered frequency response estimates into a time domain response

generating an impulse response once per interval of time;

determining a channel profile by peak detecting the impulse response;

converting the channel profile to the frequency domain creating a channel interpolator; and

generating the characterized frequency response from the channel interpolator and the frequency response estimates.

13. A method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit, the method comprising:

once per predetermined interval of time, the transceiver transmitting a signal comprising multiple carriers, a plurality of the carriers comprising training symbols, a plurality of the carriers comprising information symbols;

the subscriber unit generating frequency response estimates at the frequencies of the carriers comprising training symbols each interval of time;

converting the frequency response estimates into a time domain response

generating an impulse response once per interval of time;

filtering the impulse responses over a plurality of intervals of time;

determining a channel by peak detecting the filtered impulse responses;

converting the channel to the frequency domain creating the characterized frequency response.

14. A method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit, the method comprising:

once per predetermined interval of time, the transceiver transmitting a signal comprising multiple carriers, a plurality of the carriers comprising training symbols, a plurality of the carriers comprising information symbols;

the subscriber unit generating frequency response estimates at the frequencies of the carriers comprising training symbols each interval of time;

filtering the frequency response estimates over a plurality of intervals of time;

converting the filtered frequency response estimates into a time domain response generating a filtered impulse response once per interval of time;

determining a channel by peak detecting the filtered impulse responses;

converting the channel to the frequency domain creating the characterized frequency response.

convolving the channel interpolator with the frequency response estimates generating the characterized frequency response.

15. The method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit of claim 14, wherein filtering the frequency response estimates over a plurality of intervals of time comprises:

averaging the frequency response estimates over a plurality of intervals of time.

16. The method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit of claim 14, wherein filtering the impulse responses over a plurality of intervals of time comprises:

accumulating the frequency response estimates over a plurality of intervals of time.

17. The method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit of claim 14, wherein filtering the frequency response estimates over a plurality of intervals of time comprises:

weighted averaging of the frequency response estimates over a plurality of intervals of time.

18. A method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit, the method comprising:

once per predetermined interval of time, the subscriber unit receiving a signal comprising multiple carriers, a plurality of the carriers comprising training symbols, a plurality of the carriers comprising information symbols;

the subscriber unit generating frequency response estimates at the frequencies of the carriers comprising training symbols each interval of time;

the subscriber unit converting the frequency response estimates into a time domain response generating an impulse response once per interval of time;

the subscriber unit filtering the impulse responses over a plurality of intervals of time;

the subscriber unit determining a channel profile from the filtered impulse responses;

the subscriber unit converting the channel profile to the frequency domain generating a channel interpolator; and

the subscriber unit generating the characterized frequency response from the channel interpolator and the frequency response estimates.

19. A method of characterizing a frequency response of a transmission channel between a transceiver and a subscriber unit, the method comprising:

once per predetermined interval of time, the subscriber unit receiving a signal comprising multiple carriers, a plurality of the carriers comprising training symbols, a plurality of the carriers comprising information symbols;

the subscriber unit generating frequency response estimates at the frequencies of the carriers comprising training symbols each interval of time;



the subscriber unit filtering the frequency response estimates over a plurality of intervals of time;

the subscriber unit converting the filtered frequency response estimates into a time domain response generating a filtered impulse response once per interval of time;

the subscriber unit determining a channel by peak detecting the filtered impulse responses;

the subscriber unit converting the channel to the frequency domain creating the characterized frequency response.